Goal9 Realization of a mentally healthy and dynamic society by increasing peace of mind and vitality by 2050. Maximizing well-being and agency on the basis of interpersonal comparison of brain indicators

R&D item

2. Development and updating the system to discover pleasure and aspiration in society

Progress until FY2023

1. Outline of the project

We aim to develop a system that utilizes Virtual Reality (VR) technology to create virtual experiences to maximize personal subjective pleasure and aspiration from the perspectives of welfare and agency. We conduct work in modeling the interrelationship of aspiration and pleasure in mobility experiences, establishing mathematical methodologies for discovering pleasures and aspiration that connect to individual welfare and agency, and building a framework for discussing the optimization of experiences from an individual to a group level. By integrating these, we aim to realize a support system that allows users not to overly depend on services provided by AI systems but actively engage in social activities of their own volition.



Figure 1. Developed VR experience provider and recorder

2. Outcome so far

When designing virtual experiences in a VR space, it's necessary to mathematically grasp the user's psychological state (aspiration and pleasure) to determine what kind of content (visual and audio signals) the system should provide - a system design theory is needed. As a foundation for establishing this design theory, we built a system capable of uniformly recording VR content visuals, audio, user biometric data (gaze, pupil diameter, skin potential, heart rate, electrocardiogram, brain measurement data), and fullbody movement data (Figure 1).

Furthermore, in collaboration with the members of Research and Development Project 3-2 using the above platform, we built an experimental system to analyze mobility experiences related to aspiration and pleasure through travel in VR space. Specifically, we used a VR walking device that allowed actual movement in VR and created a VR application to tour six tourist spots. To investigate the impact of mobility experiences on memory, we built a feature that allows for photo taking on a smartphone during VR travel. This provides for retrospectively looking back on memories and establishing a system foundation for evaluating proactive actions.





Figure 2. a VR environment for social experiment Left: Condition of being ignored by others Right: Condition of engaging in prosocial behavior

Creation of VR Content in Collaboration with Sociology

In sociology, the research method known as the capability approach aims to clarify the factors that influence pleasure and aspiration by identifying the typical "can do or cannot do" elements in everyday life. In collaboration with the Research and Development Project 1 member, we have established a foundation to quantitatively analyze the impact on users' pleasure and aspiration by realistically experiencing these "can do or cannot do" scenarios in a VR environment. Specifically, as shown in Figure 2, by comparing experiences under conditions such as "engaging in prosocial behavior with others vs. being ignored by others," it becomes possible to investigate the factors that delight in pleasure and aspiration unique to each user.

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3. Future plans

In the future, to further elucidate the impact of social behaviors in VR environments on brain activity, we are considering expanding our experimental systems to not only humans but also animals such as monkeys and rats. As an inter-project collaboration, we plan to proceed with experiments on social behavior in rats and monkeys under the cooperation of Matsumoto PJ(project), Takumi PJ, and Tsutsui PJ. By setting situations in the VR environment where the other's behavior and appearance differ from usual, and measuring brain activity in these instances, we will clarify the brain activities and establish indicators for evaluating pleasure and aspiration. Finally, we aim to develop a methodology to discover pleasure and aspiration in humans using these results.

Through such efforts, we aim to realize an assistive system that can provide VR experiences that support the discovery of appropriate pleasure and aspiration for individual users to support a well-being society in 2050.

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